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EXAMINER

KAO, CHIH CHENG G

ART UNIT PAPER NUMBER

2882

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/678,025

Applicant(s)

KOIZUMI, TORU

Examiner

Chih-Cheng Glen Kao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2 and 9-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2 and 9-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: (fig. 13, “C2”), (fig. 21, “6A” and “6B”), (fig. 23, “6A”, “6B”, “1A”, and “1B”), (fig. 24, “6A” through “6D”), and (fig. 25, “1A” and “1B”).

Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The specification is objected to because of the following informalities, which appear to be minor draft errors including drawing inconsistencies and grammatical issues.

In the following format (location of objection; suggestion for correction), the following corrections may obviate their respective objections: (page 1, line 17, “has a lot of advantages

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that”; inserting - -such- - before “that”), (page 1, line 21, “microfabrication”; replacing “microfabrication” with - -microfabrication- -), (page 5, line 25, “via a reset switch line 6”; replacing “reset” with - -transfer- -), (page 18, line 21, “Switches S2”; replacing “S2” with - -22- -), (page 19, line 12, “switch S1”; replacing “S1” with - -24- -), and (page 33, lines 17-18, “switch S2”; replacing “S2” with - -22- -).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 2 and 9-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 2 in particular, the specification does not enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use a device having a signal output line and a selection control line together comprising a single common line. It is not clear how one would sequence the controls to insure that the signal is selected appropriately, transferred completely, resetted appropriately, and outputted completely, without losing the signal or transferring an unwanted signal. This would require undue experimentation to figure out the correct timing sequence and connections among unit cells for multiple controls lines.

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4. Claim 14 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification does not enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use a device having a signal output line and a transfer control line together comprising a single common line and a second common line which functions as the selection control line and the transfer control line, or a signal output line and a selection control line together comprising a single common line and a second common line which functions as the selection control line and the transfer control line. It is not clear how one would sequence the controls to insure that the signal is selected appropriately, transferred completely, resetted appropriately, and outputted completely, without losing the signal or transferring an unwanted signal. This would require undue experimentation to figure out the correct timing sequence and connections among unit cells for multiple controls lines.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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1. Claims 2, 9, 10, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi (US Patent 5955753).
2. Regarding claim 2, Takahashi discloses a solid-state image pickup device (fig. 1) comprising at least one unit cell having a photoelectric conversion portion (fig. 1, #1), an amplifying means (fig. 1, #5), a transfer means (fig. 1, #3), a reset means (fig. 1, #4), and a selecting means (fig. 1, #6) for selecting said amplifying means and outputting an amplified signal to a signal output line (fig. 1, line from #6 to #7), wherein the signal output line for outputting the amplified signal and a line (fig. 1, #4 and ϕS_0) having at least one function of three functions including a selection control line for controlling said selecting means, a transfer control line for controlling said transfer means, and a reset control line for controlling said reset means, together (fig. 1, wherein the output and control lines are together in the device) comprise a single common line in said unit cell or between two adjoining unit cells (fig. 1, lines from #6 to #7 and ϕS_0 between adjoining unit cells).
3. Regarding claim 9, Takahashi further discloses a noise and optical signal read out (col. 4, line 67) when selecting means are turned on.
4. Regarding claim 10, Takahashi further discloses a plurality of said unit cells arranged in a two-dimensional matrix (fig. 1).

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5. Regarding claim 13, Takahashi further discloses wherein the photoelectric conversion portion, amplifying means, transfer means, reset means, and selecting means are all of the same conductivity type (fig. 1).

6. Regarding claim 15, Takahashi further discloses each unit cell comprising a plurality of photoelectric conversions portions (fig. 2) connected to a common amplifying transistor (fig. 2, #5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi as applied to claim 2 above, and further in view of Yonemoto (US Patent 5894325).

8. Regarding claim 11, Takahashi discloses a device as recited above.

However, Takahashi does not disclose a power line between two unit cells.

Yonemoto teaches a power line between two unit cells (fig. 1, #14).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the device of Takahashi with the power line of Yonemoto, since

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one would be motivated to incorporate it to power all cells from just one source for more compactness (fig. 1) as implied from Yonemoto.

9. Regarding claim 12, Takahashi discloses a device as recited above.

However, Takahashi does not disclose an image pickup system comprising a pickup device, optical system, and signal processing circuit.

Yonemoto teaches an image pickup system (fig. 9) comprising a pickup device (fig. 9, #91), an optical system (fig. 9, #92), and a signal processing circuit (fig. 9, #97).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the device of Takahashi with the image pickup system of Yonemoto, since one would be motivated to incorporate this to better capture signals in a video (col. 8, lines 40-41) as implied from Yonemoto.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi as applied to claim 2 above, and further in view of Gowda et al. (US Patent 5898168).

Takahashi discloses a device as recited above.

However, Takahashi does not disclose a common line functioning as a selection and transfer control line.

Gowda et al. teaches a common line functioning as a selection and transfer control line (fig. 3b, #22 and RSL_i, and col. 4, lines 20-28).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the device of Takahashi with the common line functioning as a

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selection and transfer control line of Gowda et al., since one would be motivated to incorporate this to eliminate the separate selection line (col. 4, lines 20-28) as implied from Gowda et al. for a more compact device.

Response to Arguments

11. Applicant's arguments with respect to claims 2 and 9-15 have been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments filed 5/9/05 have been fully considered but they are not persuasive.

As noted in the Interview Summary mailed 3/7/05, the only proposed amendment that the Examiner stated would overcome the rejection in the Office Action mailed 2/4/05, would have been inserting - together- - before "comprise". However, the Amendment filed 5/9/05 also included newly added recitations stating that a single common line is alternatively between two adjoining unit cells. This additional recitation broadens the scope of the proposed amended claim in the Interview Summary. Therefore, Takahashi reads on claim 2 in the Amendment filed 5/9/05, since the signal output line and another control line are together in the device and comprise a common line between adjoining unit cells (fig. 1). Applicants' arguments are not persuasive, and the prior art remains applicable.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

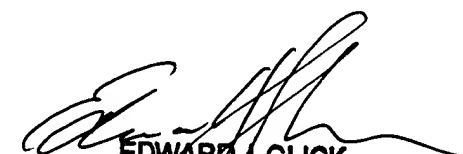
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



gk



EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER

amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting a signal to a signal output line,

5 wherein at least two of a selection control line for controlling the selecting means, a transfer control line for controlling the transfer means, a reset control line for controlling the reset means, and the signal output line in a unit cell, or between two unit
10 cells operating in time series fashion, or between two adjoining unit cells are comprised of one common line.

The operation of a solid image pickup device will be described in detail with reference to FIGS. ²⁹28 to 32.

15 FIG. 29 is a circuit diagram of a readout circuit of a solid image pickup device in which unit cells are arranged in a two-dimensional matrix pattern, and FIG. 30 is a drive timing chart of driving pulses used in this solid image pickup device.

20 In FIG. 29, a signal output line 8 is provided with a signal holding means having a holding capacity 23 that can hold a noise signal with a switch 22, and a holding capacity 25 that can hold a signal which contains an optical signal (which contains a noise
25 signal in addition to a pure optical signal and is hereinafter referred to as "an optical signal containing a noise signal") with a switch 24. These

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two kinds of signals are separately read out by a horizontal scanning circuit 26 into horizontal common output lines 27 and 28. And, with a differential amplifier 29, the noise signal is subtracted from the optical signal to provide an optical signal from which a noise component has been removed.

With reference to FIG. 30, the operation (read-out system) of a solid image pickup device will be described in detail. In the following, the case will be described wherein an OFFSET noise in a signal amplifying portion as the largest noise generated in a unit cell and a heat noise generated at the time of resetting are removed.

In general, the OFFSET noise resulting from the dispersion of threshold values of amplifying transistors Q3 is from several tens to several hundreds mV and the heat noise (\sqrt{kTC} noise) is about 1 mV.

In order to read out signals, at least operations to be implemented during periods A2 to D2 are implemented as shown in FIG. 30. Reference character $\phi 15$ denotes a controlling pulse applied via a reset switch line 5 to an electrode 15 connected thereto while reference character $\phi 17$ denotes a controlling pulse applied via a selecting switch line 7 to an electrode 17 connected thereto, reference character $\phi 16$ denotes a controlling pulse via a reset switch line 6 to an electrode 16 connected thereto, reference

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FIG. 3 is a circuit diagram of a solid image pickup device according to an embodiment of the present invention; *as related to Fig. 1*

FIG. 4 is a ~~circuit diagram of a peripheral~~
5 circuit used in the present invention;

FIG. 5 is a drive timing chart illustrating an operation of the solid image pickup device of FIG. 3;

FIG. 6 is a circuit diagram showing a basic configuration of a solid image pickup device according to another embodiment of the present invention;

FIG. 7 is a drive timing chart illustrating a basic operation of the solid image pickup device of FIG. 6;

FIG. 8 is a circuit diagram of a solid image pickup device according to ~~another embodiment of the~~
15 present invention; *as related to Fig. 6*

FIG. 9 is a ~~circuit diagram showing a basic~~
configuration of a solid image pickup device according to still another embodiment of the present invention;

FIG. 10 is a drive timing chart showing a basic operation of the solid image pickup device of FIG. 9;

FIG. 11 is a circuit diagram of a solid image pickup device according to ~~still another embodiment of~~
the present invention; *as related to Fig. 9*

FIG. 12 is a circuit diagram showing a basic configuration of a solid image pickup device according to another embodiment of the present invention;

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FIG. 13 is a drive timing chart showing a basic operation of the solid image pickup device of FIG. 12;

FIG. 14 is a circuit diagram of a solid image pickup device according to another embodiment of the present invention; *as related to Fig. 12*

FIG. 15 is a circuit diagram showing a basic configuration of a solid image pickup device according to still another embodiment of the present invention;

FIG. 16 is a drive timing chart showing a basic operation of the solid image pickup device of FIG. 15;

FIG. 17 is a circuit diagram of a solid image pickup device according to still another embodiment of the present invention; *as related to Fig 15*

FIG. 18 is a circuit diagram showing a basic configuration of another solid image pickup device according to an embodiment of the present invention;

FIG. 19 is a drive timing chart showing a basic operation of the solid image pickup device of FIG. 18;

FIG. 20 is a circuit diagram of another solid image pickup according to an embodiment of the present invention; *as related to Fig 18*

FIG. 21 is a circuit diagram showing a basic configuration of still another solid image pickup device according to an embodiment of the present invention;

FIG. 22 is a drive timing chart showing a basic operation of the solid image pickup device of FIG. 21;

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as related to claim 21

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operation of the solid image pickup device of FIG. 25;

15

pickup device;

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timing of a solid image pickup device;

timing of a solid image pickup device;

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FIG. 33 is a schematic sectional view of a unit